We claim:

1. A laser gain medium comprising

at least one active species adapted to be stimulated to emit laser light within a predetermined wavelength range,

optical feedback means defining a resonator for said laser light, said feedback means comprising at least one substantially solid cholesteric layer having a substantially planar texture exhibiting selective reflection of light defined by a reflection band tuned to said predetermined wavelength range, said cholesteric layer being obtained from reactive cholesteric mixtures selected from mixtures comprising:

a) at least one cholesteric, polymerizable monomer; or

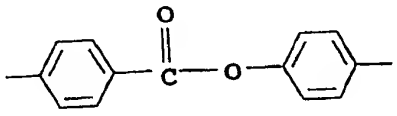
b) at least one achiral, nematic, polymerizable monomer and one chiral compound in an inert diluent; or

c) at least one cholesteric, crosslinkable oligomer or polymer selected from the group comprising cholesteric cellulose derivatives, propargyl-terminated cholesteric polyesters or polycarbonates, crosslinkable oligo- or polyorgano- siloxanes; or

d) crosslinkable cholesteric copolyisocyanates in a polymerizable diluent; or

e) chiral nematic polyesters having flexible chains whose cholesteric phase can be frozen in by rapid cooling to below the glass transition temperature.

werein said mixtures b) do not comprise mixtures of an achiral, nematic, polymerizable monomer having a mesogenic group comprising



and a chiral cholesterylcarbonate and a crosslinking agent.

2. The laser gain medium of claim 1, wherein said monomer of mixture a) is a chiral, liquid-crystalline, polymerizable monomer of the formula I

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$$\left[Z^1-Y^1-A^1-Y^2-M^1-Y^3-\right]_n X \qquad (I)$$

where

Z^1 is a polymerizable group or a radical which carries a polymerizable group,

Y^1, Y^2, Y^3 independently are chemical bonds, oxygen, sulfur,

$-CO-O-$, $-O-CO-$, $-O-CO-O-$,

$-CO-N(R)-$ or $-N(R)-CO-$,

A^1 is a spacer,

M^1 is a mesogenic group,

X is an n-valent chiral radical,

R is hydrogen or C_1-C_4-alkyl,

n is 1 to 6,

and Z^1, Y^1, Y^2, Y^3, A^1 and M^1 can be identical or different if n is greater than.

3. The laser gain medium of claim 1, wherein said cholesteric mixture b) comprises

at least one achiral, nematic, polymerizable monomer of the formula II

$$Z^2-Y^4-A^2-Y^5-M^2-Y^6-A^3-(Y^7-Z^3)_n \qquad (II)$$

where

Z^2, Z^3 are identical or different polymerizable groups or radicals which contain a polymerizable group,

n is 0 or 1

Y^4, Y^5, Y^6, Y^7 independently are chemical bonds, oxygen, sulfur,

$-CO-O-$, $-O-CO-$, $-O-CO-O-$,

$-CO-N(R)-$ or $-N(R)-CO-$,

A^2, A^3 are identical or different spacers and

M^2 is a mesogenic group,

and at least one chiral compound of formula Ia

$$\left[Z^1 - Y^1 - A^1 - Y^2 - M^a - Y^3 - \right]_n X \qquad \text{(Ia)},$$

or of formula Ib

$$Z^1 - Y^1 - A^1 - Y^2 - X^2 \qquad \text{(Ib)},$$

where Z^1, Y^1, Y^2, Y^3, A^1, X and n are as defined in claim 2, M^a is a divalent radical which comprises at least one heterocyclic or isocyclic ring system, and X^2 is a cholesteryl radical or a derivative thereof.

4. The laser gain medium of claim 1, wherein said cholesteric mixtures further comprise at least one crosslinking agent.

5. The laser gain medium of claim 1, wherein said cholesteric liquid crystal polymer is an elastomer.

6. The laser gain medium of claim 1, wherein at least one intermediate layer comprising said active species is disposed between adjacent layers of said cholesteric layers.

7. The laser gain medium of claim 1, wherein said active species is comprised in said cholesteric layer.

8. The laser gain medium of claim 7, wherein said active species is dissolved in said cholesteric layer.

9. The laser gain medium of claim 7, wherein said active species is bound to a compound of said cholesteric layer.

10. The laser gain medium of claim 1, wherein said active species is a conjugated polymer.

11. The laser gain medium of claim 1, wherein said active species is a laser dye.